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Improvements in or relating to tamper-proof containers

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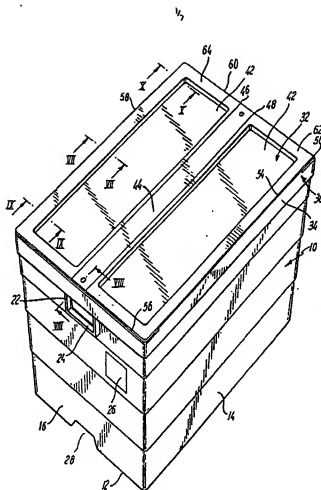
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**FIG. 1**

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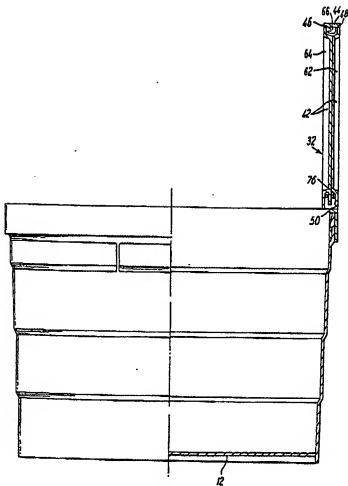


Fig 3

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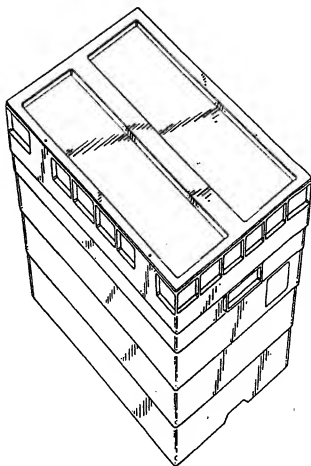
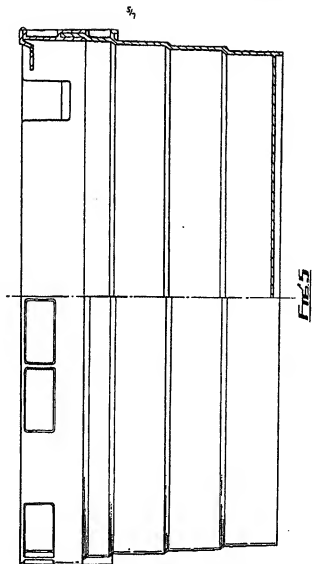


Fig. 1

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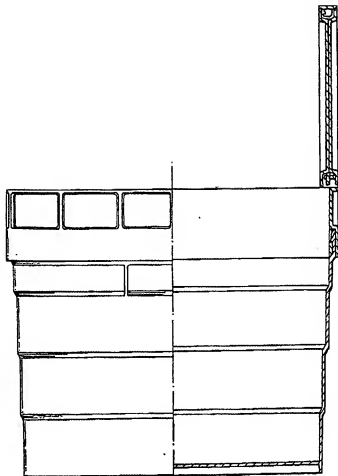
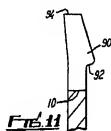
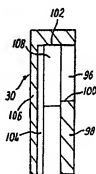
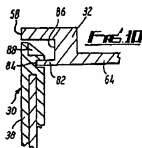
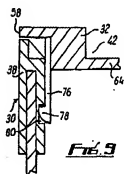
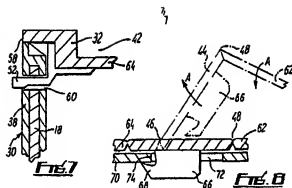


Fig. 6

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IMPROVEMENTS IN OR RELATING TO TAMPER-
PROOF CONTAINERS

The present invention concerns a tamper-proof
container for use, for example, in the storage and
5 transportation of drugs, medicines and poisons.

Drugs etc. are distributed to retail outlets
from warehouses and it is important that when a
container of drugs is in transit or storage it
cannot be easily opened for removal of its con-
10 tents.

It is important also that containers of
this nature may stack one on top of the other,
not only during transportation when their lids
are closed but also during loading and unloading
15 when they are partly filled. Furthermore when
the containers are empty and not in use it is
desirable that they may nest one within the other
to reduce storage space. As the containers are
normally manufactured from plastic material by
20 an injection moulding technique which involves
expensive tooling it is desirable that the size
of the container may be altered without completely
changing the tooling but by carrying out relatively
simple modifications to a basic tool.

25 According to the present invention there is
provided a container having a base, four walls
upstanding therefrom and a lid hinged by a first

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edge to a first well, said lid having two further hinges spaced from and parallel to said first hinge attaching the lid to the well, catch means on the underside of the lid and complementary formations on the container, said catch means being shaped to locate with said formations only when the lid is hinged about at least one of said further hinges away from its fully closed position, movement to said closed position resulting in full engagement of said catch means in said formation.

Preferably said catch means includes a first male member projecting beyond a second edge of the lid opposite its first edge and adapted to penetrate a corresponding hole in the upper region of a second well of the container opposite said first well.

Preferably second male members are provided on the underside of third and fourth edges of the lid between said further hinges, said male members each having a hook-like formation facing a second edge of the lid opposite its first edge, a slot being provided in a flap extending across the top of the container alongside third and fourth sides thereof or in said sides themselves, the slots being adapted to receive said second male members when the lid is closed each slot having its end furthest from the first hinge so positioned that with the lid in the closed position the hook-like formations underlie said ends.

Preferably third male members project downwardly

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from the underside of the lid and are arranged in two pairs, one pair adjacent the first edge and one pair adjacent a second edge of the lid opposite the first edge and are so positioned that they lie alongside the inside of the first wall of the container and a second wall opposite thereto when the lid is in a closed position. These third male members may be provided with catches at their lower ends engageable in slots formed in the inside of the tops of the first and second wall of the container.

Preferably fourth male members are provided on the underside of a second edge of the lid opposite said first edge, said fourth members being parallel to the lid but spaced below it, slots for the reception of the fourth member being provided in a second wall of the container opposite said first wall or an end flange in a flap extending across the top of the container alongside third and fourth walls thereof.

The top portion of the container is preferably formed by a collar having a channel in its underside for reception of the upper edges of the lower portion of the container. Co-operating locking means may be provided on the collar and the lower portion of the container to ensure that the collar may not be removed from the lower portion when the lid of the container is closed.

Preferably said locking means comprise a tongue portion formed in the upper edge of the lower portion

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of the container, the tongue having a detent formed on its innermost face; a recess formed on the innermost limb forming the channel in the collar in the upper portion of the container or collar so that the detent may be snap fitted into the recess on forcing the collar over the upper edge of the lower portion of the container. Preferably a groove of a width slightly greater than the width of the tongue is provided on the other limb of the channel of the collar, said groove extending from end in a direction perpendicularly to the lower edge of the channel and being adapted to accommodate the tongue when the detent deforms the tongue towards the outside of the container during fitment of the collar.

Locating slots formed perpendicularly to the upper edge of the lower portion of the container may be provided in said upper edge, corresponding ribs being formed from the base of the channel of the collar.

Two rectangular recesses may be provided in the upper surface of the lid, the ridge formed between said recesses accommodating said two further hinges. So that a similar container may be stacked on the closed lid a channel is formed in the base of the container corresponding to the ridge in the lid.

The lower portion of the container may have walls of a stepped configuration so that the depth of the lower portion of the container may be varied in accordance with a moulding technique described in our

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co-pending Applications Nos. 8230556 and 8300404. In this technique a single basic tool and removable additional portions usable with the basic tool are utilized to provide containers of differing depths.

Preferably the lower portion of the container has a peripheral flange adjacent its upper edge adapted to abut the lower edge of the upper portion of the container or collar.

Preferably the outer surfaces of third and fourth walls of the lower portion of the container are provided with abutment means, the lower surface of which is adapted to arrest the downwards movement of the container when it is nested in a further similar container. Handle means are provided on the outside of the lower portion of the container above said abutment means.

So that a similar container can be stacked on top of the container when the lid is in the open position flaps are hinged to the tops of the third and fourth sides of the container. The flaps preferably extend between the first wall and a second wall opposite thereto and may be provided with slots to accommodate second and fourth wall members. The flaps are similar to the flaps described in our co-pending Applications 8230556 and 8300404.

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An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:-

Fig. 1 shows a perspective view from above and the rear of a tamper-proof container with its lid closed,

Fig. 2 shows a front elevation half in full, half in section of the container in Fig. 1 with the lid open,

Fig. 3 shows an end elevation half in full, half in section of the container of Fig. 4 with

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the lid raised,

Figs. 4, 5 and 6 show views similar to Figs. 1, 2 and 3 respectively of a similar container which has a modified upper portion to give it an increased capacity,

Fig. 7 shows a fragmentary side elevation on the line VII - VII of Fig. 1 through a front or second wall of the upper portion of the container and the lid to illustrate a first catch for holding the lid in the closed position

Fig. 8 shows a similar view taken on the line VIII - VIII of Fig. 1 of a second catch arrangement

Fig. 9 shows a similar view taken on the line IX - IX of Fig. 1 of a third catch arrangement

Fig. 10 shows a similar view taken on the line X - X of Fig. 1 of a fourth catch arrangement and

Fig. 11 shows a sectional side elevation through a locking means for holding the upper portion or collar of the container onto the lower portion.

Fig. 1 shows a container which is manufactured in two parts by injection moulding techniques from plastic material, for example polypropylene, the lower portion of the container 10 having a base 12 and first, third, second and fourth upstanding walls 14, 16, 18, 20 respectively. Each of the walls

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is moulded with a stepped configuration such that by utilising a basic tool and removable tool sections the depth and consequently capacity of the lower portion of the container 10 may be varied. This moulding technique is described in more detail in our co-pending U.K. Patent Applications Nos. 8230556 and 8300404. Lifting handles 22 are provided on the outside of the walls 16 and 20, the handles being provided by outstending flanges arranged in a substantially rectangular form, the lower flange 24 being adapted to abut the upper edge of a similar container into which the container shown in Figure 1 is being nested to limit penetration of the container into said smaller container. In a modified arrangement the flange 22 can be provided in pairs disposed equi-distant from the centre line of the container an additional handle being recessed into the container and at a location above the lower flange 24. A ticket holder 26 may be formed on the outer faces of the container. A channel 28 extends across the base of the container for a reason to be described below.

The upper portion 30 of the container is provided by a rectangular collar having a channel formed in its bottom edge for reception of the top edge of the lower portion 10 of the container.

-s can be seen by comparing figures 1-3 with

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Figures 4-6 the collar can be manufactured in different depths so that by fitting different collars to similar lower portions 10 containers of varying capacities can be provided.

5 The collar has a lid 32 hinged thereto along its first wall 34, this first wall 34 of the collar together with the first wall 14 of the lower portion of the container combining to form the first wall of the container. Similarly
10 the second wall 38, the third wall 36 and the fourth wall 40 of the collar combine with the second, third and fourth walls 18, 16, 14 of the lower portion of the container to form the second, third and fourth walls of the container.

15 Figs. 1 and 3 show that the lid 32 is provided with two rectangular recesses 42 in its upper surface the recesses defining a central ridge 44 which, it will be realized, when one container is stacked in another will be accommodated
20 in the channel 28 formed in the base of the upper container. Two hinges 46, 48 are provided on the ribs 44 and it is preferable that the hinges 46, 48 together with the hinge 50 attaching the first edge 54 of the lid 32 to the first wall 34 of the
25 collar 30 are all plastic hinges formed integrally with the material of the lid and collar. In other words the lid and collar are moulded in a single piece.

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As it is desired to provide a tamper-proof container, a plurality of catch means are provided on the underside of the lid 32 for interfitment with corresponding slots and recesses in the top of the container walls so that the lid of the container cannot be lifted either partially or in full to permit removal of contents from the closed container, without damaging the container.

10 The first of these catch means is shown in detail in Figure 7 and comprises two spaced male members or catches 52 (only one of which is shown) which are equi-spaced on either side of the centre of the front edge 58 of the lid 32.

15 A passage 60 is formed through the second wall 38, 18 of the collar and lower portion 10 of the container through which the member 52 may project, that portion of the member 52 projecting beyond the front wall of the container being apertured

20 to accommodate a padlock seal or any other security device. It will be realised that the first male member 52 forming the catch cannot be inserted into and through the passage by

hinging the lid 32 about its first edge 54,

25 that is by pivoting it about the hinge 50, in the normal manner. It is necessary for the lower member 52 to be put in a linear direction in a plane parallel to the top of

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the container and this is possible as a result of the provision of the two further hinges 46, 48. As can be observed from Figure 8 it is possible to deflect the ridge portion 44 and the rear portion 62 of the lid such that the
5 front portion 64 lies on top of the container parallel to its top but with its second edge 58 spaced from the top of the second wall 38 of the container. It can then be slid forward to the
10 position shown in Figures 1 and 7 and during this operation the ridge 44 and rear portion 62 of the lid moves to the position shown in Fig. 1 i.e. the closed position.

This lid closing operation should be borne
15 in mind when considering the second catch means shown in Fig. 8. Two catch means are provided one alongside the third wall of the container the other alongside the fourth wall. As the second catch means are similar at each side of the container
20 only one will now be described. The catch means comprises a hook-like male member 66 fixed to and projecting downwardly from the ridge 44 of the lid 32. In Figure 8 this male member 66 is shown in full lines in an engaged position with the hook portion
25 65 at its end adjacent the second edge 58 of the lid underlying a flap 70 which projects inwardly from the third and fourth sides of the container and is shown in Figure 2. The flap 70 has a slot

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72 formed therein the width and length of the slot being greater than the width and length of the male member 66. The positioning of the forward end 74 of the slot, however, is critical as can be seen from Figure 8. It is essential that with the lid in the closed position the hook 68 of the male member is engaged under the end 74.

In Figure 8, in phantom lines there is shown the position of the lid and the male member 66 prior to the male member 66 entering the slot. It will be realized that as the first male member 52 described above with reference to Figure 7 is inserted in a linear direction into the passage 60 the ridge 44 and rear portion 62 of the lid will pivot in the direction of arrows A about the hinges 46 and 48 respectively until the condition shown in the full lines is arrived at.

It will be realized that the means described above provides catch means for the front centre, and side centres of the lid 32. Additionally the lid is secured along its entire rear edge 54 by the hinge 50. It is desirable that additional catch means are provided at the front corners of the container and one such arrangement is shown in Figure 9. Four similar arrangements are provided, one at each corner of the container but only one will be described. Figure 9 shows a third male member 76 which extends downwardly from the front

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edge 58 of the lid, and has a forwardly projecting lug 78 intended to locate in a recess 80 formed in the inside of the second wall 38 of the collar 30. It will be realized that the catch 78 fits into the recess 80 as the first male member 52 projects through the passage 60.

The male members 76 are illustrated also in Figure 3 and provide a further function. As the depth of the container is less than the

dimension of the lid between its front and rear edges 58, 54, if the lid is hinged right back that is through a further 180° in a clockwise direction as viewed in Figure 3 its front edge 58 will extend below the base of the container

and this could not be achieved unless the container was elevated. This problem can be overcome by utilising the two further hinges 46 and 48 and folding the front and rear portions 62, 64 back against themselves as shown in Figure 3, the spacing between the second hinges 46 and 48

being so chosen that the portions of the lid in the folded back position lie parallel to each other. The male members 76 may be utilised to hold the portions of the lid in the folded

back position, the free end of each member 76 projecting from the underside of the edge of one portion of the lid frictionally engaging a flange surface extending downwardly from the

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underside of the edge of the other portion of the lid. This frictional engagement may be enhanced by providing a recess similar to the recess 80 in said flange so that the catch 78 engages within the recess.

Figure 10 shows additional catch means for ensuring that the front corners of the lid cannot be lifted. Two such catch means are provided one at each corner. Once again as both catch means are of similar design only one will be described with reference to Fig. 10. The fourth catch means comprises a fourth male member 82 projecting from a flange surface 86 at the front edge 58 of the lid 32, the member 82 being parallel to the top of the lid and being of an appropriate length. A corresponding recess 84 is provided in the collar 30 and receives the male member 82 when the front portion of the lid is slid forwardly to engage the first male member 52 in the passage 60.

On consideration of Figure 2 it will be observed that if the male members 82 are positioned close to the front corners of the lid they may overlie the flap 70. It is desirable that the flap 70 has upwardly projecting and walls at its front and rear ends which are topped by flanges lying parallel to the flap and overlying the top of the first and second walls of the

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container. This arrangement limits downward movement of the flap into the container and is not illustrated. It will be realized that in these circumstances the recess 84 must be provided
5 in the upstanding front end wall of the flap rather than in the collar.

To ensure that as the front portion 64 of the lid 32 is slid forwardly its front edge 58 does not become engaged under the top of the
10 container and to assist in guiding the first third and fourth male members into their respective passages and recesses, ramps 88 are provided leading upwardly from the inside to the outside wall of the collar at the top thereof.

15 It is essential that means are provided for positively locating and holding the upper portion of the container or collar 30 on the lower portion 10. Such means are illustrated in Figure 11 and can be disposed at a plurality of convenient locations
20 at the top of the container. It is desirable that the collar can be removed from the lower portion of the container so the locking means should not be permanent. It is essential, however, that the collar cannot be removed when the con-
25 tainer is closed. Thus the locking means are accessible only from the inside of the container. Figure 11 shows that the locking means comprises a detent 90 formed on the inner surface of a tongue

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having a width of approximately 1 cm which is formed in the top edge of the lower portion 10 of the container by providing two downwardly extending narrow slots on either side of the tongue. It is preferable that the tongue is deformed in an outwards direction by a small amount. The detent has an undersurface 92 which is substantially parallel to the top edge 94 of the lower portion 10 of the container. A passage 96 of a width greater than the width of the tongue 90 is formed through the limb 98 forming the inner side of the channel in the collar 30. The lower edge 100 of said passage 96 is spaced from the base 102 of the channel by an amount which is equal to the spacing of the undersurface 92 of the detent from the upper edge 94 of the lower portion 10 of the container. A groove 104 perpendicular to the lower edge of the collar 30 is formed in the other limb 106 forming the channel. This groove accommodates the rear face of the tongue when the collar is forced downwardly over the top edge of the lower portion 10 of the container, the detent 90 causing the tongue to deflect outwardly into the groove until it can snap fit into the channel 96.

It will be realised that to remove the collar an operation opposite to that described above is

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followed.

Fig. 11 shows a rib 108 projecting downwardly into the channel from its base 102. This rib is laterally spaced from the passage 96 and is provided to give lateral location of the collar relative to the lower portion 10 of the container, if required. It will be realized that corresponding grooves are cut in the top edge of the lower portion 10 of the container to accommodate rib 108.

In operation, the container can be loaded when its lid occupies the position shown in Figures 2, 3, 5 and 6 or when its lid folded right back so that it lies alongside the first wall 14 of the container. With the flaps 70 in the position shown in Figures 2 and 5 a similar container can be stacked on top of the open container and this is useful if the container is only partly loaded or unloaded. By pivoting the flap 70 about the hinges 73, which may be separate hinges or formed integrally with the collar 30, in a clockwise direction as viewed in Figure 2, the entire top of the container can be open so that if the container is empty a similar container can be nested therein to reduce the space required for storage of empty containers. Conveniently snap means may be provided on the lateral edges of the flap so that it can be held in the folded back position.

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When a container has been loaded the flaps are returned to the position shown in Figures 2 and 5, if they are not already in this position, and the lid can be closed by the operation described above.

5 Pedlocks or other security means can be pressed through the portions of the male members 52 projecting through the front of the container and other security devices, in the form of seals, tapes etc. may be fitted. A similar loaded container with its lid open or closed can then be
10 stacked on top of the closed container.

It will be realised that numerous modifications can be made without departing from the scope of the invention, for example the lower portion of the
15 container need not be of a stepped configuration and may have any suitable handles, abutments or other ancillary means. A flange may be formed round the outside of the lower portion 10 of the container near its top to form a ledge on which
20 the outer limb 106 of the collar 30 may rest. Some of the catch devices may be omitted or re-positioned and the hinges need not be integrally formed hinges but could be separate hinges fitted to the various
25 portions of the lid and flaps or could be formed by known techniques to provide snap fitting hinges formed from components moulded on to the respective parts. Means other than those described above for locking the collar to the lower portion of the

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container may be employed as indicated, for
example, in Figures 2 and 5.

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Claims:

1. A container having a base, four walls upstanding therefrom and a lid hinged by a first edge to a first wall, said lid having two further hinges spaced from and parallel to said first hinge attaching the lid to the wall, catch means on the underside of the lid and complementary formations on the container, said catch means being shaped to locate with said formations only when the lid is hinged about at least one of said further hinges away from its fully closed position, movement to said closed position resulting in full engagement of said catch means in said formations.
2. A container as claimed in claim 1, in which said catch means includes a first male member projecting beyond a second edge of the lid opposite its first edge and adapted to penetrate a corresponding hole in the upper region of a second wall of the container opposite said first wall.
3. A container as claimed in claim 1 or claim 2, in which second male members are provided on the underside of third and fourth edges of the lid between said further hinges, said second male members each having a hook-like formation facing a second edge of the lid opposite its first edge, a slot being provided in a flap extending across the top of the container alongside third and fourth sides thereof or in said sides themselves, the slots being adapted to receive

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said second male members when the lid is closed, each slot having its end furthest from the first hinge so positioned that with the lid in the closed position the hook-like formations underlie said ends.

4. A container as claimed in any one of claims 1 to 3, in which third male members project downwardly from the underside of the lid and are arranged in two pairs, one pair adjacent the first edge and one pair adjacent a second edge of the lid opposite the first edge and are so positioned that they lie alongside the inside of the first well and a second well opposite thereto when the lid is in a closed position.

5. A container as claimed in claim 4, in which said third male members are provided with catches at their lower ends engageable in slots formed in the inside of the tops of the first and second well of the container.

6. A container as claimed in any one of the preceding claims, in which fourth male members are provided on the underside of a second edge of the lid opposite said first edge, said fourth members being parallel to the lid but spaced below it, slots for the reception of the fourth member being provided in a second wall of the container opposite said first well or an end flange in a flap extending across the top of the container alongside third and fourth walls thereof.

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7. A container as claimed in any one of the preceding claims, in which the top portion of the container is formed by a collar having a channel in its underside for reception of the upper edges of the lower portion of the container.

8. A container as claimed in claim 7, in which co-operating locking means are provided on the collar and the lower portion of the container to ensure that once fitted the collar is not removable from the lower portion when the lid of the container is closed.

9. A container as claimed in claim 8, in which said locking means comprise a tongue portion formed in the upper edge of the lower portion of the container, the tongue having a detent formed thereon on its innermost face; a recess formed on the innermost limb forming the channel in the collar in the upper portion of the container or collar so that the detent may be snap fitted into the recess on forcing the collar over the upper edge of the lower portion of the container.

10. A container as claimed in claim 9, in which a groove of a width slightly greater than the width of the tongue is provided on the other limb of the channel of the collar, said grooves extending from and in a direction perpendicularly to the lower edge of the channel and being adapted to accommodate the tongue when the detent deforms the tongue towards the outside

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of the container during fitment of the collar.

11. A container as claimed in any one of claims 8, 9 and 10, in which locating slots formed perpendicularly to the upper edge of the lower portion of the container are provided in said upper edge, corresponding ribs being formed from the base of the channel of the collar.

12. A container as claimed in any one of the preceding claims, in which two rectangular recesses are provided in the upper surface of the lid, the ridge formed between said recesses accommodating said two further hinges.

13. A container as claimed in any one of the preceding claims, in which the lower portion of the container has walls of a stepped configuration.

14. A container as claimed in any one of claims 7 to 13, in which the lower portion of the container has a peripheral flange adjacent its upper edge adapted to abut the lower edge of the upper portion or collar of the container.

15. A container as claimed in any one of claims 7 to 14, in which the outer surfaces of third and fourth walls of the lower portion of the container are provided with abutment means, the lower surfaces of

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which are adapted to arrest the downward movement of the container when it is nested in a further similar container.

16. A container as claimed in claim 15, in which handle means are provided on the outside of the lower portion of the container above said abutment means.

17. A container as claimed in any one of the preceding claims, in which flaps are hinged to the tops of third and fourth sides of the container to support a further similar container thereon while the lid is in the open position.

18. A container as claimed in claim 17, in which the flaps extend between the first wall and a second wall opposite thereto.

19. A container as claimed in claim 18, in which the flaps are provided with slots to accommodate second and fourth male members.

20. A container substantially as hereinbefore described with reference to the accompanying drawings.
